REMARKS

This paper is being provided in response to the Office Action mailed October 23, 2002, for the above-referenced application. In this response, Applicants have amended claim 1 to correct typographical errors and have added new claims 8-15. Applicants respectfully submit that the amendments to the claims and the new claims are supported by the originally filed application.

The rejection of claims 1-2, 4-7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,369,324 to Saether (hereinafter "Saether") in view of U.S. Patent No. 3,525,005 to E. S. Beyers (hereinafter "Beyers") and further in view of U.S. Patent No. 5,723,931 to Andrey (hereinafter "Andrey") and Electric Motors and Motor Controls by Jeff Keljik, pages 139-142 (hereinafter "Keljik") is hereby traversed and reconsideration thereof is respectfully requested.

Independent claim 1 recites a DC motor with a rotor unit having a cylindrical field magnet with a rotating shaft press fit at the center. The cylindrical magnet has S and N poles that alternate in a circumferential direction. There is a stator unit arranged circumferentially *around* the rotor made of a plurality of stator yokes. The yokes are made of a large number of *circumferentially-stacked* thin plates, each of which is a salient pole, and to which is attached a plurality of coil units made by winding a magnetic wire on a bobbin. Each of the S and N poles has a plurality of stage in the axial direction, and are circumferentially shifted from each other by a predetermined shift amount. Claims 2-7 depend from independent claim 1.

The cited reference of Saether discloses an electric motor consisting of an inside stator and a concentrically positioned outside rotor within which are positioned a high number of permanent magnets. Magnetic fields from the permanent magnets interact with flux-conducting blocks that engage coil cores on the stator. The flux-conducting blocks comprise multiple radially upright profile stems (24, 26) of multiple thin sheets having "T" or "Γ" shapes. (See Figs 7, 9 and 10; and col. 5, lines 31-50). Magnetic rows in the rotor are established such that magnets are not the same in an axial direction of the rotor. (See col. 5, lines 58-59 and Figure 12).

The Beyers reference discloses an alternator comprising a stator and a rotor having attached magnets and which is separated from the stator by an air gap. A flotably mounted shaft carries the rotor. The invention is designed to provide an electric generator that maintains a substantially constant voltage over a wide range of speeds.

The Andrey reference discloses a multiple pole, multiple phase, permanent magnet motor comprising a rotor and a stator. The rotor has a plurality of permanent magnet poles and the stator comprises a plurality of stator slots and an equal number of stator teeth. Disposed on the stator are a plurality of phase windings comprising a plurality of coils, and a method is provided for determining the number of turns and winding direction for each of the plurality of coils.

The Keljik reference discloses three-phase induction motors comprising a stator wound with magnetic wire. The Office Action uses Keljik to show that a motor is the reverse process of a generator.

Applicants' independent claim 1 recites a stator unit which is circumferentially arranged *around* the rotor unit. On the other hand, Saether discloses an inside stator part and a rotor part 12 placed outside the stator part. (See Saether's Abstract and Figures 1 and 8). Furthermore, Applicants' claim recites that the stator unit is comprised of a plurality of stator yokes formed by *circumferentially* stacking a large number of thin plates each of which constitute a salient pole. (See Figure 2A and page 7, lines 2-6). In contrast, Saether discloses *radially* aligned upright profiles of thin plates. This radial positioning of the upright profile stems 24, 26 is shown in Saether's Figures 7 and 8. The flux gap is then formed between the blocks of thin plates radially aligned from the center axle.

Saether discloses a stepper motor driven by inputted pulse voltage for its stepping operation. Applicants' claimed invention recites a DC (brushless) motor driven by sine-wave voltage and designed to reduce cogging torque of the motor. Saether does not appear to even recognize the problem of cogging torque, and Applicants respectfully submit that Saether does not teach or suggest at the least the above-noted features as claimed by Applicants.

Applicants respectfully submit that neither Beyers, Andrey nor Keljik overcome the above-noted deficiencies of Saether with respect to Applicants' claim 1. Specifically, none of these references taken alone or in combination disclose a stator unit circumferentially arranged *around* the rotor unit and comprised of a plurality of stator yokes formed by *circumferentially* stacking a large number of thin plates each of which constitute a salient pole and wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction by a predetermined shift amount.

For at least the above discussed reasons, Applicants respectfully submit that independent claim 1, and thus dependent claims 2-7, which depend from claim 1, are patentable over the cited references, whether taken alone or in any combination. Accordingly, Applicants respectfully request that the rejection to these claims be reconsidered and withdrawn.

The rejection of claim 3 under 35 U.S.C. §103(a) as being unpatentable over Saether in view of Beyers, Andrey and Keljik and further in view of U.S. Patent No. 5,034,642 to Hoemann et al. (hereinafter "Hoemann") is hereby traversed and reconsideration thereof is respectfully requested.

The features of independent claim 1 are discussed above. Dependent claim 3 further recites that the rotor position detection element is adjusted by ½ of the shift amount of the respective stages.

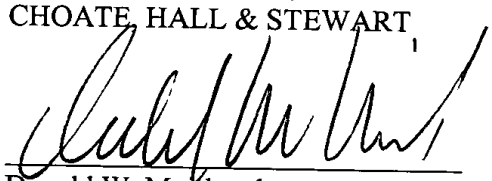
The cited references of Saether, Beyers, Andrey and Keljik are discussed above. Hoemann is used by the Office Action to show that the recited feature of the ½ shift for the position detector is known. Applicants respectfully submit that nothing in Hoemann overcomes the above-noted deficiencies of Saether, Beyers, Andrey and Keljik with respect to Applicants' independent claim 1. Specifically, none of these references taken alone or in combination disclose a stator unit circumferentially arranged *around* the rotor unit and comprised of a plurality of stator yokes formed by *circumferentially* stacking a large number of thin plates each of which constitute a salient pole and wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction by a predetermined shift amount.

Since the independent claim has been shown to be in patentable condition over the suggested combination of references, then dependent claim 3 is also in condition for allowance. Therefore, Applicants respectfully request that the rejection of claim 3 be reconsidered and withdrawn.

Applicants have added new claims 8-15 and respectfully submit that these claims are patentable over the prior art of record.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
CHOATE, HALL & STEWART



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Date: February 20, 2003

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